GERMANY’S WIND ENERGY INDUSTRY
Market Conditions, Investment Environment and Business Opportunities

EUROPE’S LEADING WIND ENERGY MARKET
Germany represents around 30 percent of total installed capacity in Europe and 12 percent of global installed capacity. By the end of 2012, total installed capacity accounted for 31,331 MW. German wind energy sector development has been driven by a strong onshore market. By the end of 2012, some 22,972 turbines were installed in Germany. The federal states are currently evaluating further land areas for wind energy deployment. The growing potential for repowering can be seen in the total number of 252 turbines replaced by 161 modern multi-megawatt class wind turbines in 2012. The Wind Energy Association (BWE) expects a German annual market of 1 GW [EUR 1.5 billion turnover] in the years ahead. The offshore wind market is likewise forecast to grow. Around 280 MW offshore capacity was installed in Germany by the end of 2012. Seven offshore wind parks with over 440 wind energy turbines (approximately 1,900 MW) are under construction; a total of 29 offshore wind parks were approved by the end of 2012.

REDEFINING THE ENERGY MIX
After the decision in 2011 to phase out nuclear power by 2022, power produced from renewable energy sources reached a share of 23 percent of Germany’s gross power consumption at the end of 2012 - wind power accounts for eight percent of this total. Wind energy will continue to be a key technology in Germany’s future energy mix; with total domestic electricity production share forecast to reach 25 percent by 2025. The Renewable Energy Sources Act (EEG) provides a stable and financially attractive framework to achieve these ambitious targets. According to the German Wind Energy Association (BWE), wind energy capacity in Germany should reach 45,000 MW onshore and six to seven thousand MW offshore by 2020.

Advantages of Locating in the World’s Largest Wind Industry
- Strong political & public support for wind energy in Germany
- Growing level of employees (currently over 100 thousand are employed in the wind industry)
- “Made in Germany” product quality
- Europe as a key market for German products
- Well-rehearsed global export infrastructure (66 percent of total German wind industry output is export related)
OFFSHORE WIND MARKET GROWTH
At the beginning of May 2011, Germany’s first offshore wind farm in the Baltic Sea went online. The nearly 50 MW park, known as Baltic 1, is situated 16 km north of the Darss/Zingst peninsula. The park joins North Sea wind farm alpha ventus (60 MW), which began operating in 2010. As of February 2013, seven projects are currently under construction in the North Sea. Twenty-six offshore wind parks in the German Bight and another three projects in the Baltic Sea were formally approved by the end of 2012.

LARGE-SCALE PORT INFRASTRUCTURE
German ports along the coastline are being expanded to meet offshore wind industry demands. European Union (EU) and federal state level authorities and private companies alike have made significant investments to develop heavy load port terminals in close proximity to production facilities. Large quayside storage areas and options for the pre-assembly of foundations and wind turbine components are opened up. The ports represent in-situ offshore logistics solutions and facilitate optimized inbound and outbound supply chain management.

OFFSHORE WIND DEPLOYMENT INFRASTRUCTURE
German offshore seaports are not only readily equipped to meet German offshore wind demand but also present an ideal hub to serve a number of northern European offshore wind farm projects. A 2013 study conducted by EWEA has identified approved offshore wind farm projects in Europe with a capacity of 18.4 GW. In 2013 around 1,400 MW of new capacity is expected to be connected to the grid. By 2030, major markets will be the UK, Germany, the Netherlands, and Sweden. Germany’s central location – with shores at the North Sea and Baltic Sea where 83 percent of all approved wind parks in Europe are located – gives it a significant locational advantage. Ports along the North Sea and Baltic Sea lie directly along the coast and are conveniently connected through the Kiel Canal.
RENEWABLE ENERGY SOURCES ACT AND ITS FEED-IN TARIFFS

LONG-TERM PLANNING SECURITY
The Renewable Energy Sources Act (EEG) provides an attractive and guaranteed feed-in tariff for 20 years plus year of commissioning. Since 2000 the law has successfully formed the basis for the strong expansion of renewable energies in Germany by establishing a secure financial environment. The German government’s Energy Concept makes further provision for an array of offshore wind energy support measures – including the KfW development bank’s “Offshore Wind Power” program which makes a total credit volume of EUR 5 billion available for wind farm financing. In addition, the new liability rules for the offshore wind grid connections introduced to the energy industry law (EnWG) in January 2013 create planning security for offshore wind projects and raise investor confidence along the entire supply chain.

ONSHORE FEED-IN TARIFFS
The springboard for positive German market development has been the profitability of wind energy as a result of ambitious government initiatives, and the EEG in particular. The initial tariff of 8.8 cents (EUR) per kWh is paid for at least five years. This period is extended according to location and reference yield. Thereafter the final tariff of 4.8 cents (EUR) kWh is paid for the time remaining.

OFFSHORE FEED-IN TARIFFS
Offshore, the initial 20-year long guaranteed EEG feed-in tariff is equivalent to 15 cents (EUR) for the first 12 years or 19 cents (EUR) for the first eight years and extended subject to location. The larger the water depth of the wind turbine and the further from shore it is located, the longer the higher initial tariff compensation level is paid. Thereafter the sum payable amounts to 3.5 cents (EUR) per kWh. The annual percentage decrease for tariffs and bonuses for electricity generated from offshore wind installations shall be seven percent from the year 2018 onwards (commissioning date).

The EEG also provides bonuses of 0.47 cents (EUR) per kWh for improved network integration and 0.49 cents (EUR) per kWh for wind energy facility repowering. For installations commissioned in the subsequent calendar years, the tariffs and bonuses will be reduced progressively each year by 1.5 percent.

DIRECT MARKETING SCHEME
To improve market and system integration, incentives for the direct marketing of power from renewable energies were introduced to the EEG in 2012. Producers can now directly market their electricity at the energy exchange, foregoing the historical fixed feed-in tariff. Producers who choose to do so will now instead receive the market price as well as a market and management premium.
INCREASING COMPETITIVENESS

STABLE LABOR COSTS
Since 2002, wages have risen in most European countries (EU-27). While some countries – particularly those in eastern Europe – experienced an increase of more than seven percent, Germany recorded the lowest labor cost growth within the EU at just 1.6 percent on yearly average. High productivity rates and steady wage levels make Germany an extremely attractive investment location. Labor cost increase levels have been the lowest in Europe in recent years. Measured in unit labor costs, Germany experienced a major increase in productivity the past decade. In marked contrast to other European countries which have experienced an overall increase in unit labor costs, Germany’s unit labor costs decreased by a yearly average of 0.4 percent for the period 2004 to 2011. Falling unit labor costs represent a genuine competitive cost advantage – particularly in manufacturing.

Highly flexible working practices such as fixed-term contracts, shift systems, and 24/7 operating permits contribute to enhance Germany’s international competitiveness as a suitable investment location for internationally active businesses.

OUTSTANDING LABOR FORCE
Germany provides ready access to a reliable workforce, as recent international investments in the sector confirm. One hundred thousand highly trained and experienced workers are directly employed in the wind energy sector.

More than 80 percent of the German workforce is in possession of an academic degree or has received formal vocational training. The country’s dual education system – unique in combining the benefits of classroom-based and on-the-job training over a period of two to three years – is specifically geared to meet industry needs. Moreover, recruitment services are actively supported by government agencies.

WORLD-CLASS EDUCATION STANDARDS
According to the Organisation for Economic Co-operation and Development (OECD), Germany has an excellent standard in higher education. In 2011, some 517,000 students – at more than 420 universities – embarked on a course of academic study. Technical fields of study experienced an undergraduate enrollment level increase of more than eight percent. Germany’s share of university students in the sciences, mathematics, computer sciences, and engineering is the second highest in the EU, with around 30 percent of all students. Many German universities have also developed specific technical degree programs focusing on renewable energies and wind energy.

INVESTMENT SECURITY
Wind energy requires stable policy frameworks with well-designed feed-in tariffs and sufficient legal stability. Germany is world renowned for its highly developed economic, legal and political frameworks which provide investors – in all industry sectors – with the necessary security for their business investments.

OPEN AND TRANSPARENT MARKETS
German law makes no distinction between Germans and foreign nationals regarding investments, available incentives or the establishment of companies. The legal framework for foreign direct investment in Germany favors the principle of freedom of foreign trade and payment.
**German Wind Value Chain Selection**

<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Equipment</th>
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<td>02 Enercon</td>
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<td>08 KUKA Systems</td>
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<td>19 juwi Wind</td>
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<td>21 wpd</td>
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<td>22 Availon</td>
<td>Erfurt</td>
<td>Service, Maintenance &amp; Repair</td>
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<td>25 SSC Wind</td>
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<td>26 Center for Wind Power Drives</td>
<td>Aachen</td>
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<td>27 Fraunhofer IWES</td>
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<tr>
<td>28 ForWind - Zentrum für Windenergieforschung</td>
<td>Bremen, Hannover, Oldenburg</td>
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</tr>
</tbody>
</table>

**Wind Value Chain Player Selection by Location**

- **North Sea**
- **Baltic Sea**
- **Czech Republic**
- **Austria**
- **Bavaria**
- **Baden-Württemberg**
- **Thuringia**
- **Saxony**
- **Brandenburg**
- **Mecklenburg-Vorpommern**
- **Schleswig-Holstein**
- **Niedersachsen**
- **Niedersachsen**
- **Saxony-Anhalt**
- **Hessen**
- **Rheinland-Pfalz**
- **Saarland**
- **North Rhine-Westphalia**
- **Berlin**
- **Hamburg**
- **Bremen**
- **France**
- **Luxembourg**
- **North Rhine-Westphalia**
- **Bavaria**
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- **Berlin**
- **Hamburg**
- **Bremen**
- **France**
- **Luxembourg**

**DIVERSIFIED MARKET AND PROFESSIONAL R&D CENTERS**

International and domestic companies alike have already set up production facilities and R&D centers in Germany – in both the onshore and offshore sectors. Internationally leading wind turbine manufacturers and sophisticated component suppliers are also located in Germany. Significant business opportunities exist in the emerging offshore wind sector, with large-scale investment required in both inland and offshore infrastructure to secure wind park supply. Solid onshore service industry infrastructure – including renowned project developers and operators – is spread across the country to meet domestic and European demand. These and other factors all point to Germany’s unique market structure, best characterized by its highly dynamic and diversified local supply industry. International companies can take advantage of Germany’s unique conditions to set up production and R&D centers in close proximity in order to cater to growing demand. Significant incentives and other financial support measures are also made available specifically for this purpose.

- Please refer to our website for up-to-date wind industry information: www.gtai.com/windenergy
OUR SERVICES

ABOUT US

Germany Trade & Invest is the foreign trade and inward investment agency of the Federal Republic of Germany. The organization advises and supports foreign companies planning to expand into the German market and assists German companies seeking to enter foreign markets.

INVESTMENT LOCATION GERMANY

Germany Trade & Invest provides close-to-market information to international companies looking to enter German markets. Our specialist industry teams prepare all of the relevant information essential to business success in Germany. Germany Trade & Invest’s comprehensive range of information services includes:

- Market and industry reports
- Market entry analyses
- Business and tax law information
- Business and labor law information
- Funding and financing information

BUSINESS LOCATION SERVICES

Germany Trade & Invest supports international companies from market entry to business start-up in Germany. Expert project teams advise and assist in the business establishment phase. Germany Trade & Invest’s range of free services includes:

- Legal and tax-related project support
- Funding and financing advisory services
- Site visit organization
- Local partner and network matchmaking
- Public and private partner coordination

All investment-related services are provided entirely free of charge. Our specialist industry teams have hands-on experience in their respective industries and treat all investor enquiries with the utmost confidentiality.

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